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Plan of Work

# Hamakua Area Agricultural Water Study

UNITED STATES DEPARTMENT OF AGRICULTURE  
Economics, Statistics, and Cooperatives Service  
Forest Service  
Soil Conservation Service

STATE OF HAWAII  
Department of Land and Natural Resources  
Mauna Kea Soil and Water Conservation District

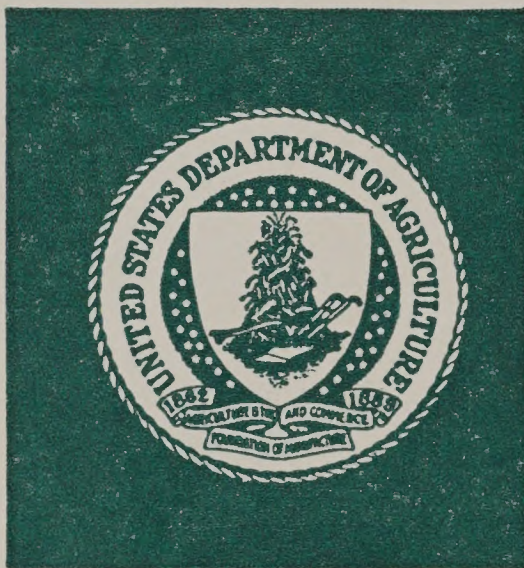
Honolulu, Hawaii  
April 1979

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PLAN OF WORK

HAMAKUA AREA AGRICULTURAL WATER STUDY

UNITED STATES DEPARTMENT OF AGRICULTURE  
Economics, Statistics, and Cooperatives Service  
Forest Service  
Soil Conservation Service

STATE OF HAWAII  
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April 1979

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Economist	
Engineer	
Hydrologist	
District Conservationist	
Soil Scientist	
Resource Conservationist	
Public Information Officer	
Forester	
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## HAMAKUA AREA AGRICULTURAL WATER STUDY

### INTRODUCTION

This study is a result of the concerns of the local people in the Hamakua area. The local sugar plantations, ranchers, farmers, and the Hamakua Development Council identified the agricultural water problems in the area and, through the Mauna Kea Soil and Water Conservation District (SWCD), requested the State Department of Land and Natural Resources (DLNR) to approach the USDA Soil Conservation Service (SCS) to make a study and identify projects that would alleviate the agricultural water problems. In a letter dated September 12, 1977, DLNR requested SCS to initiate a study of agricultural water in the Hamakua area.

The SCS State Conservationist for Hawaii decided that this request could best be served through a cooperative river basin study that would involve the USDA agencies - Soil Conservation Service; Forest Service; and Economics, Statistics, and Cooperatives Service. The three agencies comprise the USDA Field Advisory Committee (FAC).

The FAC held meetings with the various local interests to identify the major problems of the area. A proposal to study was prepared by SCS and transmitted to the SCS Administrator for approval and funding to prepare the Plan of Work. The SCS Administrator authorized the preparation of the Plan of Work on June 14, 1978.

#### Authority for the Study

The U. S. Department of Agriculture (USDA) conducts cooperative river basin studies designed to provide USDA planning assistance to federal, state, and local governments under the authority of Section 6 of Public Law 83-566. This study will be conducted under this authority.

#### Expected Results

The USDA will prepare special reports of its findings for agency use at the end of Phase II of the study. The reports will consist of inventory data collected during Phases I and II that will be available for immediate use. Various working documents analyzing specific aspects of the study will be provided for study participants. Meetings held with the sponsors and local people at the conclusion of Phase II will determine any additional needs and set the stage for Phases III and IV.

The study report, to be completed in Phase V, will contain data on alternative plans as well as a preferred plan. The report will also contain information on funding recommendations.



High priority elements as identified in alternatives that are acceptable may be implemented by local groups prior to completion of the study report.

The DLNR and the Mauna Kea SWCD are hopeful the study will result in feasible and acceptable alternative plans that will help alleviate the agricultural water problems in the study area. Also, that funding for implementing the preferred plan can be arranged within a reasonable time frame.

#### How Results will be Used

Study findings will be used by federal, state, and county agencies, and private firms to define and reach agreement on the best solutions to the agricultural water problems and to prepare recommendations for better use of land in the area. The findings will also be used to select funding alternatives to implement the preferred plan. DLNR can use the results to set project priorities for the area.

The special reports will be available for use by federal, state, and county agencies, and private groups for planning and designing structural measures and as reference material for the consideration of environmental aspects of the basin.

#### DESCRIPTION OF STUDY AREA

The study area is located in the Hamakua District of the island of Hawaii, also known as the Big Island. It encompasses almost all of Hydrographic Area I as delineated by the Hawaii Water Resources Regional Study. The area is bounded by Laupahoehoe on the east, the Mauna Kea Forest Reserve boundary on the south, Wailoa Stream on the west and the Pacific Ocean on the north (see Study Area Map). The area totals about 200,000 acres.

In developing the Plan of Work, consideration was given to having the study area include the Waimanu Valley as it could be a source of water. However, the Hamakua Area Agricultural Water Study Steering Committee recommended the valley not be included because it is being converted to the Waimanu Estuarine Sanctuary. This is being done by the Department of Planning and Economic Development (DPED) and the DLNR through the National Coastal Zone Management Act.

Agricultural uses which include grazing, sugarcane, truck crops, and orchards cover 125,000 acres. The remaining acreage is in forest reserve, urban and miscellaneous land.

The major economic activity in the area is the sugarcane industry followed by the livestock industry and truck crop operations.

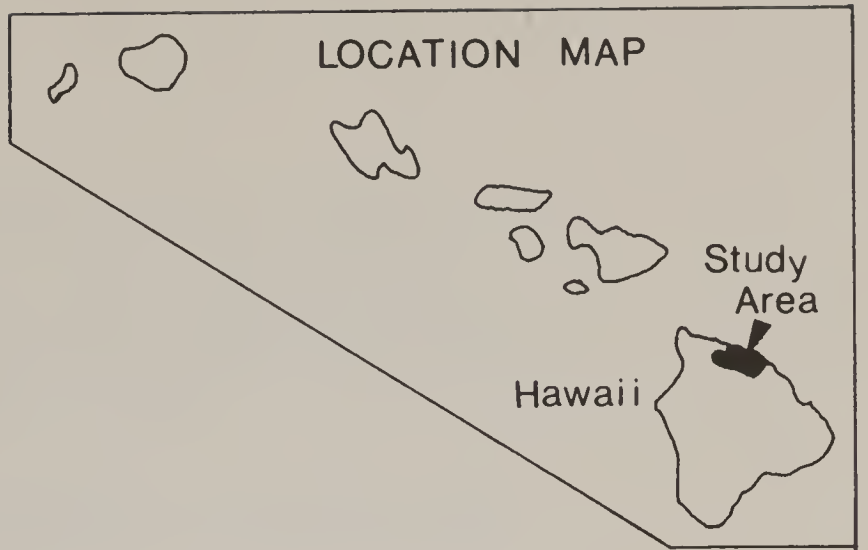
There is one sugar company in the area, Hamakua Sugar Company, owned by Theo. H. Davies and Co., Ltd. Besides this one large sugar company, there are approximately 165 independent cane growers. The livestock











HAMAKUA AREA  
AGRICULTURAL WATER STUDY  
Hawaii County, Hawaii





industry includes a portion of Parker Ranch and Kukaiau Ranch as well as 150 smaller ranches and two dairies. The truck crop operations which are located mainly in the Waimea area, consist of about 130 small farms averaging 15 acres in size. The area population in 1976 was about 10,000 and included about 850 families directly identified with production and processing of agricultural goods.

The major population centers are Honokaa and Waimea, located in the north central and southwest portions of the study area, respectively.

#### RELATIONSHIP TO OTHER STUDIES AND PROGRAMS

The study area is included in the soon-to-be-published Hawaii Water Resources Regional Study, a federal water resources level "B" type river basin study. It is also included in the Type IV River Basin Survey of the Island of Hawaii, "Inventory of Selected Water, Land and Related Resources Data," which was published in 1975. Both studies emphasized the need to develop additional agricultural water for the Hamakua area.

There is an ongoing erosion-hydrologic research project on two agricultural watersheds within the study area. This is a cooperative study involving the USDA Science and Education Administration and the University of Hawaii, College of Tropical Agriculture.

This study will be coordinated with the Water Master Plan for the Island of Hawaii, the Northeast Community Development Plan, the Kohala Community Development Plan, and the Big Island Resource Conservation and Development Area Plan to ensure that it complements these plans. It will also be coordinated with the Hawaii State Plan, the State 208 Plan, and the Coastal Zone Management Plan. Coordination will be accomplished by meetings with the State Department of Planning and Economic Development and the County of Hawaii. Besides the meetings, these departments will have the opportunity to review and comment on the study report prior to its final approval.

#### STUDY CONCERNS

The public concerns (problems) were identified by the Mauna Kea Soil and Water Conservation District and the State Division of Water and Land Development. These concerns were refined through meetings with various local interests; i.e., plantations, ranchers, independent cane growers, farmers, dairymen, etc.

The following table lists concerns relating to the agricultural and other water problems which have been presently identified in the Hamakua area.

<u>Public Concerns (Problems)</u>	<u>Component Need</u>	<u>Selected Concerns to be Studied</u>
Insufficient Irrigation Water Supply	More irrigation water for farmlots in Ahualoa, Lalamilo, Paauiilo Mauka, and sugarcane fields between elevations 900 feet to 1,500 feet from Paauiilo to Waipio.	X
Insufficient Stockwater in the Upper Areas	More stockwater up to elevation 5,000 feet in Paauiilo Mauka, Honokaa, Paauhau and area between Keanakolu and Hanaipoi.	X
Improved Agricultural Water Distribution System	Reassess the present water distribution system and suggest changes.	X
Land Treatment and Irrigation Water Management	Installing land treatment practices on irrigated agricultural land and promote further use of irrigation water management on these lands.	X
Better Use for Idle Agricultural Land	Make use of idle agricultural land owned by the plantations and the state.	X
Flooding, Erosion, and Sedimentation	Reduce flooding, erosion, and sedimentation in Waipio, Honokaa, Kalopa, and Kapulena-Kukuihaele areas.	
Domestic Water Needs	More domestic water in Paauiilo Mauka, Honokaa, Waimea, and Papaaloo. Also need more water pressure in these areas.	

Information on domestic water needs and flooding, erosion, and sedimentation problems are found in existing reports, i.e., Hawaii Water Resources Regional Study and the Type IV River Basin Survey of the Island of Hawaii, "Inventory of Selected Water, Land and Related Resources Data."

Reports on the flooding, erosion, and sedimentation problems have been prepared by SCS for the Waipio, Honokaa, Kalopa, and Kapulena-Kukuihaele areas. No projects have been implemented to alleviate these problems.



## SELECTED CONCERNS

These concerns were selected because they are the ones that reflect the most pressing agricultural water problems and are those that affect most of the people in the area.

Improvement of the water distribution system and increasing the availability of water to areas not now having sufficient water will improve the agricultural operations in the area.

There are areas that are well suited for agricultural operations if a dependable supply of water could be provided. Some of these areas may not now be in agricultural use so it will require some changes in land use.

## WORK OUTLINE

The study concerns expressed as problems have been identified by the sponsors with the participation of the local citizens advisory group. The selected concerns are stated in this Plan of Work and the work outline in this section shows the major activities, work items, responsibilities and time estimates that will be required to complete the study. The study will be undertaken following procedures in the USDA Procedures for Planning Water and Related Land Resources.

The study schedule is divided into six phases:

### Phase I - Study Management

This phase of the study will be devoted to organizational and management activities. It will include: determining management procedures, developing tentative schedules for committee and public meetings, setting a timetable for progress reports, and developing a plan to maintain liaison with other federal agencies and state and county departments.

This phase will also include developing a public participation plan.

### Phase II - Inventory Coordination

This phase will include organizing work groups such as forestry, fish and wildlife, analyzing published data, and soliciting public input in the inventory of resources. The resources to be inventoried include: archeological and historical resources, fish and wildlife resources, forest resources, land resources, and water resources. Reports will be prepared for each of the resources inventoried. Public concerns will be analyzed and component needs refined. An economic base study will be made. Contracts will be prepared and awarded for the following: water rights, environmental assessment, and solutions.

1. Water Rights

The purpose of this contract is to examine the water rights situation in the study area. The nature of this contract is to review existing legal records to address the following topics:

- a. Hawaiian water rights.
- b. Surface water rights.
- c. Ground water rights.
- d. Current status of water rights in Hawaii and how it will affect the study.
- e. Ownership of water rights in the study area.

Since this is an agricultural water study, the topic of water rights needs to be addressed. The question of water rights will be important when implementing the selected study elements. This contract is estimated to take 2 months.

2. Environmental Assessment

The purpose of this contract is to document the existing environmental conditions and predict probable conditions resulting from installation of selected elements.

Information in the "Guide for Environmental Assessment," published by the Soil Conservation Service in 1977, will be used to make the assessment.

This contract is estimated to take 4 months.

3. Solutions Contract

The solutions contract will examine elements that will increase the availability of agricultural water to the area. The nature of the contract is to examine, design, and make cost estimates of elements that will satisfy the agricultural water concerns of the study. Some of the elements to be examined are:

- a. Reservoirs.
  - (1) Location.
  - (2) Preliminary design.
  - (3) Cost.

b. Wells.

- (1) Location.
- (2) Development cost.

c. Agricultural water distribution system.

- (1) Open channels.
- (2) Pressure gravity pipe.
- (3) Preliminary design and cost.

This contract is estimated to take 5 months.

Phase III - Alternatives

In this phase, solutions will be developed for each of the needs and the cost as well as environmental and other effects determined for these alternative solutions.

Alternative plans will be developed in this phase.

Phase IV - Plan Selection

During this phase, public meetings will be held to present the alternative plans to the general public for their consideration. From the public's comments on the alternatives, a preferred plan will be developed. High priority elements of the preferred plan will be recommended for implementation.

Phase V - Study Report

This phase is devoted to preparing the study report. Drafts of the study report will be presented at meetings for public review. The study report will be printed and distributed.

Phase VI - Follow-up

A follow-up program will be initiated six months after the study report is distributed. This program will consist of arranging meetings with the sponsors and federal, state and county agencies to discuss implementation of the preferred plan.





## SPECIALIST WORK OUTLINE





AGENCY: USDA, Soil Conservation Service

SPECIALIST: Planning Staff Leader

PHASE	ACTIVITY	WORK ITEM	PRODUCT	START DATE	END DATE
I	Study Management	Determine management procedures with sponsors.	Management procedure plan.	4/20/79	4/24/79
		Develop tentative schedules - include steering and FAC meetings.	Meeting schedule.	4/25/79	4/30/79
		Prepare progress reports.	Periodic progress reports.	On-going throughout study.	
		Maintain liaison with other federal agencies and state and county departments.	Keep federal, state and county departments informed of study status.	On-going throughout study.	
II	Public Participation	Form steering committee and citizen's advisory group.	Steering committee and citizen's advisory group.	Committees formed in POW stage.	
		Develop a public participation plan.	Public participation plan.	4/30/79	5/2/79
		Formulate techniques to get public to meetings.			
	Inventory Coordination	Participate in workshops and public meetings.	Workshops and public meetings.	Ongoing throughout study.	
		At steering committee meeting, explain study objectives to state agencies, county departments, SCS field office, organizations, and individuals.		5/25/79	5/30/79
		Organize work groups such as Forestry, and Fish & Wildlife; solicit public input in inventory phase.	Work groups.	6/1/79	6/6/79
		Make work assignments and work schedules and coordinate work.	Work assignments and schedules.	6/5/79	6/11/79
		Review and refine component needs.		11/20/79	11/30/79

# HAMAKUA AREA AGRICULTURAL WATER STUDY

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AGENCY: USDA, Soil Conservation Service SPECIALIST: Planning Staff Leader

PHASE	ACTIVITY	WORK ITEM	PRODUCT	START DATE	END DATE
III	Alternatives - NED	Develop plan elements that contribute to NED.	NED elements.	7/2/80	7/7/80
		Determine environmental and other effects for each element.	Environmental effects.	7/28/80	8/8/80
		Determine costs of planned elements, where applicable.	Element costs.	8/21/80	8/25/80
		Review effects displayed in four-account system.		9/2/80	9/2/80
	Alternatives - EQ	Develop plan elements that contribute to environmental quality through participation of work groups, agencies, and the public.	EQ elements.	7/1/80	7/15/80
		Review costs of planned elements.		8/22/80	8/22/80
		Review benefits of planned elements.		8/22/80	8/22/80
		Determine environmental and other effects of each element.	Environmental effects.	7/23/80	8/6/80
		Review effects displayed in four-account system.		9/2/80	9/2/80
		Review alternatives report prepared for public consideration.		9/15/80	9/16/80

AGENCY: USDA, Soil Conservation Service

SPECIALIST: Planning Staff Leader

PHASE	ACTIVITY	WORK ITEM	PRODUCT	START DATE	END DATE
IV	Plan Selection	Public meetings to present alternative plans.	Public information.	9/26/80	10/9/80
		Select elements from alternatives that are preferred by the public.	Elements preferred by public.	10/14/80	10/20/80
		Determine environmental and other effects of each element.	Environmental effects.	10/28/80	11/18/80
		Recommend implementation of high-priority elements.		--	--
V	Element Funding	Review effects displayed in account system.		11/25/80	11/28/80
		Review selected plan elements.		12/2/80	12/8/80
	Report Preparation	Determine applicability to various federal, state and county cost-sharing and other types of programs.	Funding for implementation of preferred plan.	12/2/80	12/15/80
		Write first draft of study report.	Preliminary draft of study report.	1/2/81	1/29/81
VI	Follow-up Program	Prepare second draft of study report.	Draft of study report.	3/18/81	3/31/81
		Prepare final study report.	Final study report.	5/11/81	5/22/81
		Print and distribute study report.	Distribution.	6/11/81	--
		Meetings with sponsors and federal, state and county agencies to discuss implementation of preferred plan.		1/82	--



AGENCY: USDA, Soil Conservation Service SPECIALIST: Economist

PHASE	ACTIVITY	WORK ITEM	PRODUCT	START DATE	END DATE
I	Study Management	Develop tentative schedules. Include steering and FAC meetings.	Meeting schedules.	4/25/79	4/26/79
II	Economic Base Study	Gather basic data: Number of farms; average farm size; irrigation; crop acreage and production; livestock, production; value of all agricultural products.	Tables.	4/30/79	5/16/79
		Collect population census data of area.	do.	5/24/79	5/25/79
		Write economic base study report.	Economic base study report.	8/8/79	9/19/79
III	Land Resources Inventory	Determine maximum potential yield and crops best suited for soils in the area using data collected from farmers and previous studies. Determine effects of irrigation on production cost and yields.	Data and evaluation.	6/1/79	11/7/79
		Write land resources report.	Land resources report.	11/8/79	11/28/79
		Participate in development of NED plan elements.	NED Plan.	7/1/80	7/22/80
	Alternatives - NED	Participate in determining the environmental effects of each plan element.	Environmental effects.	7/28/80	8/8/80
		Display effects in four-accounts system.	Account system.	8/27/80	9/2/80

AGENCY: USDA, Soil Conservation ServiceSPECIALIST: Economist

PHASE	ACTIVITY	WORK ITEM	PRODUCT	START DATE	END DATE
III	Alternatives - EQ	Determine benefits of planned elements where applicable.	Benefits.	8/12/80	8/25/80
		Participate in determining environmental and other effects of each element.	Environmental effects.	7/23/80	7/29/80
		Display effects in four-accounts system.	Account system.	8/27/80	9/2/80
		Assist in preparation of alternatives report.	Alternatives report.	9/11/80	9/16/80
IV	Plan Selection	Present alternative plans at public meetings.		10/2/80	10/7/80
		Participate in selection of elements that are preferred by the public.	Elements preferred by public.	10/14/80	10/24/80
		Determine benefits of plan elements where applicable.	Benefits.	10/28/80	11/14/80
		Participate in determination of environmental and other effects of each element.	Environmental effects.	11/7/80	11/10/80
		Display effects in four-accounts system.	Account system.	11/18/80	11/28/80
		Prepare maps, charts, tables, etc.	Maps, charts and tables.	12/2/80	12/4/80



AGENCY: USDA, Soil Conservation ServiceSPECIALIST: Economist

PHASE	ACTIVITY	WORK ITEM	PRODUCT	START DATE	END DATE
V	Report Preparation	Assist in preparation of the first draft of study report.	First draft of study report.	12/2/80	2/10/81
		Assist in the preparation of the second draft of study report.	Second draft of study report.	3/16/81	4/13/81
		Assist in the preparation of the final study report.	Final study report.	5/11/81	6/10/81

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AGENCY: USDA, Soil Conservation Service

SPECIALIST: Engineer

PHASE	ACTIVITY	WORK ITEM	PRODUCT	START DATE	END DATE
I	Study Management	Determine management procedures with sponsors.	Management procedure plan.	4/23/79	4/23/79
		Develop tentative schedules - include steering and FAC meetings.	Meeting schedule.	4/27/79	4/30/79
		Maintain liaison with other federal agencies and state and county departments.	Keep federal, state and county departments informed of study status.	On-going throughout study.	
	Public Participation	Form steering and local citizen's advisory committees.		Committees formed in POW stage.	
		Assist in the development of a public participation plan. Formulate techniques to get public involvement.	Public participation plan.	5/1/79	5/1/79
		Participate in workshops and public meetings.	Workshop and public meetings.	Ongoing throughout study.	
II	Contracts	Prepare and let environmental impact assessment (EIA) contract.	EIA contract.	5/11/79	7/9/79
		Administer EIA contract.		7/10/79	10/31/79
		Prepare and let water rights contract.	Water rights contract.	5/4/79	6/5/79
		Administer water rights contract.		6/6/79	7/30/79
		Prepare and let solutions contract.	Solutions contract.	12/4/79	1/29/80
		Contract administration.		1/30/80	6/30/80

# HAMAKUA AREA AGRICULTURAL WATER STUDY

AGENCY: USDA, Soil Conservation Service

SPECIALIST: Engineer

PHASE	ACTIVITY	WORK ITEM	PRODUCT	START DATE	END DATE
	Inventory Coordination	At steering committee meeting, explain study objectives to state agencies, county departments, SCS field office, organizations and individuals.		5/29/79	5/29/79
		Assist in organizing work groups such as Forestry, and Fish and Wildlife; solicit public input in inventory phase.	Work groups.	6/1/79	6/1/79
		Assist with work assignments and work schedules and coordinate work.	Work assignments and schedules.	6/5/79	6/6/79
		Review and refine component needs.		11/29/79	11/30/79
	Land Resources Inventory	Review land use map.		8/9/79	8/9/79
		Review land ownership map.		8/15/79	8/15/79
		Review soil suitability data.		9/7/79	9/7/79
		Review land resources report.		10/19/79	10/19/79
	Water Use Inventory	Determine present water usage.	Basic data.	4/30/79	5/7/79
		Determine future water demands in area from projected agricultural and population demands.	Basic data.	5/11/79	7/9/79
		Analyze basic data and determine need for water supply development.	Basic data.	7/10/79	7/23/79
		Prepare water use report.	Water use report.	7/24/79	8/7/79



AGENCY: USDA, Soil Conservation Service

SPECIALIST: Engineer

PHASE	ACTIVITY	WORK ITEM	PRODUCT	START DATE	END DATE
II	Water Resources Inventory	Assist hydrologist in gathering data on stream and impoundments.	Basic data.	8/14/79	9/11/79
		Assist hydrologist in gathering data on water systems.	Basic data.	9/18/79	10/16/79
		Assist hydrologist in gathering data on ground water.	Basic data	10/23/79	11/5/79
		Locate and analyze potential reservoir sites.	Reservoir sites.	11/6/79	12/17/79
		Review water resources report.		1/31/80	1/31/80
III	Alternatives - NED	Participate in NED plan element development.	NED plan.	7/2/80	7/7/80
		Determine cost of plan elements where applicable.	Cost estimates.	7/28/80	8/25/80
		Participate in determining environmental effects of each element.	Environmental effects.	8/8/80	8/11/80
		Review effects displayed in four-account system.		9/2/80	9/3/80
	Alternatives - EQ	Assist in development of plan elements that contribute to environmental quality through participation of work groups, agencies, and the public.	EQ elements.	7/11/80	7/14/80
		Develop costs of planned elements where applicable.	Costs of elements.	8/12/80	8/25/80
		Participate in determining environmental and other effects of each element.	Environmental effects.	8/5/80	8/6/80
		Review effects displayed in four-account system.		9/2/80	9/3/80
		Assist in writing alternatives report.	Alternatives.	9/3/80	9/16/80

AGENCY: USDA, Soil Conservation Service

SPECIALIST: Engineer

PHASE	ACTIVITY	WORK ITEM	PRODUCT	START DATE	END DATE
IV	Plan Selection	Participate in presenting alternative plans at public meetings.		10/2/80	10/7/80
		Select elements from alternatives that are preferred by the public.	Elements selection.	10/21/80	10/22/80
		Determine cost of planned elements where applicable.	Costs of planned elements.	10/28/80	11/3/80
		Review benefits of plan elements.		11/14/80	11/14/80
		Assist in determining environmental and other effects of each element.	Environmental effects of plan elements.	11/6/80	11/7/80
		Recommend implementation of high-priority elements.		--	--
		Review effects displayed in four-account system.		11/26/80	11/28/80
V	Element Funding	Prepare displays (maps, charts, tables, etc.).	Maps, tables pertaining to structural works.	12/2/80	12/29/80
		Review selected plan elements.		12/2/80	12/3/80
		Assist in determining applicability for federal, state and county cost-sharing and other type programs.	Applicability for cost sharing.	12/11/80	12/12/80
VI	Report Preparation	Assist in preparing first draft of study report.	First draft of study report.	1/2/81	1/22/81
		Assist in the preparation of the second draft of study report.	Second draft of study report.	3/13/81	3/19/81
		Assist in the preparation of the final study report.	Final study report.	5/11/81	5/15/81
		Meetings with sponsors and federal, state and county agencies to discuss implementation of preferred plan.		1/82	--

AGENCY: USDA, Soil Conservation Service

SPECIALIST: Hydrologist

PHASE	ACTIVITY	WORK ITEM	PRODUCT	START DATE	END DATE
I	Study Management	Develop tentative schedules - include steering and FAC meetings.	Meeting schedule.	4/25/79	4/30/79
	Public Participation	Participate in workshops and public meetings.	Workshops and public meetings.	Ongoing throughout study.	
	Inventory Coordination	Review and refine component needs.		11/20/79	11/30/79
II	Water Use Inventory	Assist engineer in determining present water usage.	Basic data.	4/20/79	5/2/79
		Assist engineer in determining future water demands in area from projected agricultural and population demands.	Basic data.	5/18/79	6/1/79
		Assist engineer in determining the need for water supply development.	Basic data.	6/6/79	6/19/79
		Assist engineer in writing water use report.	Water use report.	6/26/79	7/6/79



# HAMAKUA AREA AGRICULTURAL WATER STUDY

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AGENCY: USDA, Soil Conservation Service SPECIALIST: Hydrologist

PHASE	ACTIVITY	WORK ITEM	PRODUCT	START DATE	END DATE
II	Water Resources Inventory	Conduct water resources literature search.	Basic data.	4/20/79	6/5/79
		Gather basic data on climatic conditions from available reports such as: precipitation, runoff, temperature, evaporation, etc.	Basic data.	6/6/79	7/9/79
		Gather basic data on water quality.	Basic data.	7/19/79	8/2/79
		Gather basic data on streams and impoundments such as: flow-duration stream analysis, regional analysis of stream gages, etc.	Basic data.	7/16/79	10/10/79
		Gather basic data on water systems from Board of Water Supply, sugar plantations, etc.	Basic data.	10/11/79	10/31/79
		Assist in preparing water rights contract.		5/7/79	5/8/79
		Gather basic data on ground water from previous studies.	Basic data.	11/1/79	11/28/79
		Analyze potential reservoir sites.	Reservoir sites.	11/29/79	1/10/80
		Prepare water resources report.	Water resources report.	1/11/80	1/31/80
III	Alternatives - EQ	Participate in determining environmental and other effects of each element.	Environmental effects of each element.	8/8/80	8/11/80
IV	Plan Selection	Participate in public meetings to present alternative plans.		10/3/80	10/7/80

AGENCY: USDA, Soil Conservation Service

SPECIALIST: Hydrologist

PHASE	ACTIVITY	WORK ITEM	PRODUCT	START DATE	END DATE
V	Report Preparation	Assist in preparing first draft of study report.	First draft of study report.	1/2/81	1/29/81
		Assist in preparing second draft of study report.	Second draft of study report.	3/16/81	3/20/81
		Assist in preparing final study report.	Final study report.	5/11/81	5/15/81

AGENCY: USDA, Soil Conservation ServiceSPECIALIST: District Conservationist

PHASE	ACTIVITY	WORK ITEM	PRODUCT	START DATE	END DATE
I	Study Management	Determine management procedures with sponsors.	Management procedure plan.	4/20/79	4/24/79
		Maintain liaison with other federal agencies and state and county departments.	Keep county departments informed of study status.	Ongoing throughout study.	Ongoing throughout
	Public Participation	Form steering and local citizen's advisory committees.	Steering and advisory committees.	Committees formed in POW stage.	Committees formed
		Hold workshops and public meetings.	Workshops and public meetings.	Ongoing throughout study.	Ongoing throughout
II	Inventory Coordination	At steering committee meeting, explain study objectives to state agencies, county departments, SCS field offices, organizations, and individuals.		5/24/79	5/25/79
	Economic Base Study	Assist economist in gathering data on: number and average size of farms; irrigated crop acreages and production; livestock production; value of all agricultural products.	Basic data.	4/30/79	5/16/79
	Forest Resources	Review basic data on forest land ownership; forest types; environmental relationships.		5/18/79	5/22/79
	Land Resources	Determine effects of irrigation on production cost and yields.	Basic data.	6/1/79	6/14/79
		Gather basic data on present land use and management.	do.	8/1/79	8/10/79
		Gather basic data on land ownership.	do.	8/14/79	8/15/79



AGENCY: USDA, Soil Conservation ServiceSPECIALIST: District Conservationist

PHASE	ACTIVITY	WORK ITEM	PRODUCT	START DATE	END DATE
III	Alternatives - EQ	Assist in developing plan elements that contribute to environmental quality through participation of work groups, agencies, and the public.	EQ plan elements.	7/7/80	7/11/80
IV	Plan Selection	Participate in public meetings to present alternative plans.  Recommend implementation of high-priority elements.		10/2/80  --	10/3/80  --
V	Report Preparation	Review first draft of study report.  Review second draft of study report.		2/12/81  4/14/81	3/12/81  5/11/81
VI	Follow-up Program	Meetings with sponsors and federal, state and county agencies to discuss implementation of preferred plan.		1/82	--

AGENCY: USDA, Soil Conservation ServiceSPECIALIST: Soil Scientist

PHASE	ACTIVITY	WORK ITEM	PRODUCT	START DATE	END DATE
II	Land Resources	Gather data on soil suitability such as: maximum potential yield and crops best suited for soils in the area.	Basic data.	8/1/79	9/11/79
		Prepare soil suitability map.	Map and description.	11/6/79	11/30/79
V	Report Preparation	Review first draft of study report.		2/12/81	3/12/81
		Review second draft of study report.		4/14/81	5/11/81

## HAMAKUA AREA AGRICULTURAL WATER STUDY

AGENCY: USDA, Soil Conservation Service

SPECIALIST: Resource Conservationist

PHASE	ACTIVITY	WORK ITEM	PRODUCT	START DATE	END DATE
II	Inventory Coordination	Assist in organizing fish and wildlife work group committees.	Fish and wildlife work group committees.	6/1/79	6/1/79
	Economic Base Study	Assist economist in determining effects of irrigation on production cost and yields. Consult with farmer and other agencies.	Effects of irrigation on production.	6/5/79	6/15/79
	Fish & Wildlife Inventory	Inventory freshwater fish species. Inventory wildlife habitat, threatened and endangered species. Identify problem.		These work items will be done throughout the EA contract.	
		Assist engineer in preparing contract for EA. Review fish and wildlife report.	Contract for EA.	5/10/79 11/6/79	5/16/79 11/7/79
	Forest Resources Inventory	Assist forester in preparing forest resources report.	Forest resources report.	8/21/79	8/29/79
III	Alternatives - NED	Participate in developing plan elements that contribute to NED.	NED plan elements.	7/3/80	7/7/80
	Alternatives - EQ	Participate in developing plan elements that contribute to environmental quality through participation of work groups, agencies, and the public.	EQ plan elements.	7/10/80	7/11/80
V	Report Preparation	Review first draft of study report.		2/12/81	3/12/81
		Review second draft report of study report.		4/14/81	5/11/81



# HAMAKUA AREA AGRICULTURAL WATER STUDY

AGENCY: USDA, Soil Conservation Service

SPECIALIST: Public Information Officer

PHASE	ACTIVITY	WORK ITEM	PRODUCT	START DATE	END DATE
I	Public Participation	Formulate public participation plan. Assist in planning workshops and public meetings.	Public participation plan. Workshops and meetings.	4/19/79 Ongoing throughout study.	5/2/79
IV	Plan Selection	Assist in planning public meetings to present alternative plans.	Public meetings.	10/3/80	10/3/80
V	Report Preparation	Review first draft of study report. Review second draft of study report.		2/12/81 4/14/81	3/12/81 5/11/81

AGENCY: USDA, Forest Service

SPECIALIST: Forester

PHASE	ACTIVITY	WORK ITEM	PRODUCT	START DATE	END DATE
I	Study Management	Determine management procedures with sponsors.	Management procedure plan.	4/23/79	4/24/79
		Develop tentative schedules - include steering and FAC meetings.	Schedule.	4/27/79	4/30/79
	Public Participation	Assist with developing a public participation plan.	Public participation plan.	5/2/79	5/2/79
		Participate in workshops and public meetings.	Workshops and public meetings.	Ongoing throughout study.	
II	Inventory Coordination	Assist in organizing forestry work groups.	Forestry work group.	6/1/79	6/4/79
		Make work assignments and work schedules.		6/5/79	6/6/79
	Forest Resources	Conduct a forest land inventory to determine existing and potential plantation areas, commercial forest land, etc.	Basic data.	5/4/79	5/23/79
		Inventory actual and projected forest production.	Basic data.	5/25/79	6/1/79
		Gather basic data on forest industry.	Basic data.	6/12/79	6/18/79
		Identify problems.		6/26/79	7/13/79
		Prepare forest resources report.	Forest resources report.	8/7/79	9/4/79

# HAMAKUA AREA AGRICULTURAL WATER STUDY

Page 2 of 2

AGENCY: USDA, Forest Service

SPECIALIST: Forester

PHASE	ACTIVITY	WORK ITEM	PRODUCT	START DATE	END DATE
III	Alternatives - NED	Determine environmental and other effects of each element.	Environmental effects.	8/5/80	8/11/80
	Alternatives - EQ	Participate in developing plan elements that contribute to environmental quality through participation of work groups, agencies and the public.	EQ plan elements.	7/7/80	7/11/80
		Determine environmental and other effects of each element.	Environmental effects of each element.	7/23/80	7/29/80
IV	Plan Selection	Participate in public meetings to present alternative plans.	Public meetings.	10/2/80	10/3/80
		Participate in selection of elements from alternatives that are preferred by the public.	Element selection.	10/21/80	10/22/80
		Participate in determining environmental and other effects of each element.	Environmental effects of each element.	11/7/80	11/10/80
V	Element Funding	Review selected plan elements.		12/2/80	12/2/80
		Determine applicability to various federal, state and county cost-sharing and other types of programs.	Applicability to federal and state programs.	12/11/80	12/12/80
	Report Preparation	Review first draft of study report. Review second draft of study report.		2/12/81 4/14/81	3/12/81 5/11/81



AGENCY: USDA, Economics, Statistics, and Cooperatives Service SPECIALIST: ESCS Economist

PHASE	ACTIVITY	WORK ITEM	PRODUCT	START DATE	END DATE
I	Study Management	Develop tentative schedule - include steering and FAC meetings.	Meeting schedule.	4/27/79	4/30/79
II	Economics Base Study	Review economics base study report.		9/20/79	9/21/79
V	Report Preparation	Review first draft of study report. Review second draft of study report.		2/12/81 4/14/81	3/12/81 5/11/81

# IIAMAKUA AREA AGRICULTURAL WATER STUDY

Page 1 of 2

AGENCY: USDA, Soil Conservation Service

SPECIALIST: Typist

PHASE	ACTIVITY	WORK ITEM	PRODUCT	START DATE	END DATE
I	Study Management	Type tentative schedules (meetings).		5/1/79	5/1/79
		Type progress reports.		Throughout study.	
	Public Participation	Type participation plan.		5/8/79	5/9/79
II	Economic Base Study	Type economic base study report.		8/29/79	8/31/79
	Contracts	Type contract for environmental assessment.		5/21/79	5/23/79
		Type water rights contract.		5/10/79	5/15/79
		Type solutions contract.		12/17/79	12/21/79
	Land Resources Inventory	Type land resources report.		11/26/79	11/28/79
	Water Use Inventory	Type water use report.		8/1/79	8/7/79
	Water Resources Inventory	Type water resources report.		1/25/80	1/31/80

AGENCY: USDA, Soil Conservation Service

SPECIALIST: Typist

PHASE	ACTIVITY	WORK ITEM	PRODUCT	START DATE	END DATE
III	Alternatives - EQ	Type alternatives report.		9/9/80	9/15/80
V	Report Preparation	Type first draft of study report.		2/3/81	2/10/81
		Type second draft of study report.		4/7/81	4/13/81
		Type final study report.		6/4/81	6/10/81



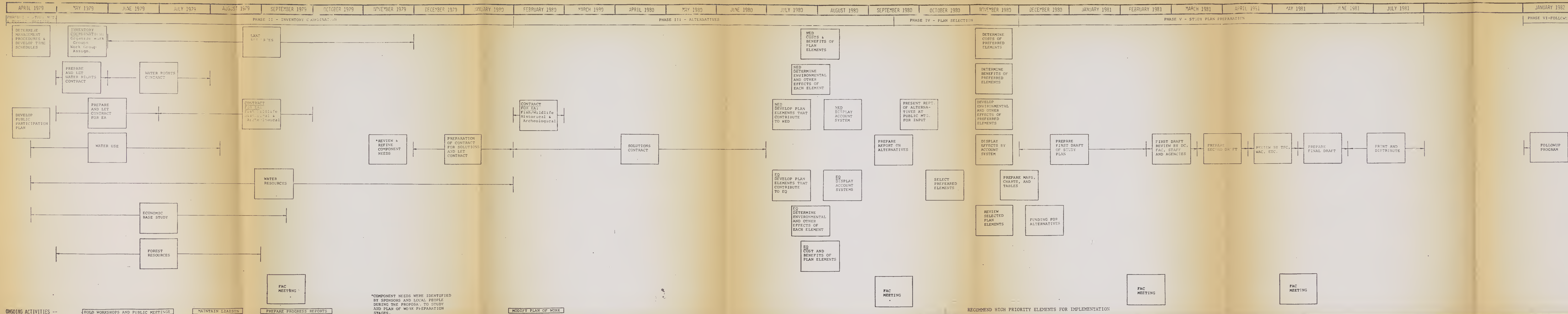


## SCHEDULE FOR MAJOR ACTIVITIES





SCHEDULE FOR "MAJOR ACTIVITIES" -- HAMAKUA AREA AGRICULTURAL WATER STUDY





## REPORTS

### Special Reports

Special reports will consist of an inventory of the resources, problems, needs and opportunities within the study area and will include:

1. Land Resources
2. Water Resources
3. Water Use Inventory
4. Economic Base
5. Forest Resources
6. Fish and Wildlife
7. Archeological Resources
8. Alternatives

These reports will be evaluated and used to formulate practicable alternatives and will also serve as the basis for preparing the study report. A hundred (100) copies of each report will be printed.

### Study Report

A study report will be prepared. The outline of this report is as follows:

Preface

Summary

Chapter 1 Problems and Concerns

Chapter 2 Preferred Plan

Chapter 3 Implementation

Chapter 4 Alternative Plans

Appendix Basin Resource Base

Three hundred (300) copies of the study report will be printed. The study report will be used in programs designed to seek approvals for implementation of the preferred plan. USDA authorities and other federal, state, and local programs that provide technical assistance and cost-sharing opportunities will be utilized to the extent available.

After the study report is completed, SCS will assist the state agencies, local government, conservation districts, and the public with the implementation of the preferred plan.



### Field Examination Report

During the study, it may be necessary to investigate selected watersheds. A field examination report will be prepared. If the report is positive, determinations will be made on funding alternatives. The field examination report will then become an appendix to the study report and will be available to local organizations interested in the development of these water and related land resources.

### Planning Progress Reports

Planning progress reports will be submitted at the FAC and at steering committee meetings. Progress will be reported by work items in the Plan of Work.

## MANAGEMENT OF THE STUDY

### Administration and Coordination

The administration of the USDA agencies' involvement in this study will be through the FAC.

The Hawaii SCS planning staff will coordinate the study efforts of all agencies and will prepare a detailed work outline, including precedence diagrams, manpower assignments by work items and completion dates.

In addition, a steering committee, chaired by the Division of Water and Land Development (DOWALD), has been established. The purpose of the steering committee is to provide input for the preparation of the POW, and to guide and monitor the progress of the study.

A citizens advisory group has been formed. This group consists of local people involved in various agricultural activities. The purpose of this group is to review the study's progress and proposals, advise the steering committee on public attitudes toward the study, conduct public information meetings in cooperation with the Mauna Kea SWCD, coordinate the input from the local people and supply data to the study.

### Membership

The representatives of the FAC are:

Jack P. Kanalz, Chairman  
Soil Conservation Service

Norman E. Landgren, Member  
Economics, Statistics, and Cooperatives Service

Lyle Klubben, Member  
Forest Service

Robert Clayton, Alternate Member  
Forest Service

The FAC will hold meetings in the SCS office (Room 4316 Prince Kuhio Federal Building, 300 Ala Moana Blvd., Honolulu, Hawaii) to review progress, changes in procedures, schedules, cost estimates, etc. These meetings have been tentatively scheduled for: September 1979, September 1980, February 1981, and May 1981.

The steering committee is composed of representatives from the following organizations:

Federal

Soil Conservation Service  
Economics, Statistics, and Cooperatives Service  
Forest Service

State

Department of Hawaiian Home Lands  
Department of Land and Natural Resources  
Department of Agriculture  
Mauna Kea Soil and Water Conservation District  
College of Tropical Agriculture, University of Hawaii

County

Department of Research and Development  
Department of Water Supply

Private

Theo. H. Davies & Co., Ltd.  
Hawaii Chapter Conservation Council for Hawaii

The membership of the citizens advisory group is made up of representatives from the following agricultural sectors:

Farmers  
Hamakua Development Council  
Independent Cane Growers  
Mauna Kea Soil and Water Conservation District  
Parker Ranch  
Ranchers  
Sugar Plantations

USDA Staff

The SCS planning staff is composed of a staff leader, hydraulic engineer, and an agricultural economist. Technical assistance will be required from the SCS irrigation engineer, civil engineer, soil scientist, public information officer, and resource conservationist, as well as the district conservationist.

FS input will be through the Pacific Islands Forester stationed in Honolulu. It is not anticipated that ESCS will have a member on the USDA staff.

In addition, in areas where SCS does not have the expertise and for tasks which will take up a major portion of staff time, contracts will be awarded to private firms for such items as environmental assessments, water rights, and solutions to needs.

### Schedule Summary

The following are completion dates for major planning activities:

Define problems, determine objectives and prepare POW	- December 1978
Inventory and analysis of resources, identification of needs and special reports	- January 1980
Development and evaluation of alternative plans	- September 1980
Selection of preferred plan	- December 1980
Draft report	- April 1981
Study report	- July 1981
Follow-up program	- January 1982

### Funding

Estimated and accumulated expenditures for fiscal years 1978, 1979, 1980, 1981, and 1982 are as follows:

Cost Summary by Fiscal Year						
Agency	Accumulated : Expenditures:	Cost Estimates by Fiscal Year				
	1978	1979	1980	1981	1982	Total
ESCS	\$ 1,000	\$ 1,100	\$ 1,000	\$ 1,300	\$ -0-	\$ 3,400 <sup>4/</sup>
FS	1,000	7,600	2,500	3,000	-0-	13,100 <sup>4/</sup>
SCS	16,000	103,000 <sup>1/</sup>	142,000 <sup>2/</sup>	51,000 <sup>3/</sup>	3,000	299,000
Total	\$ 18,000	\$111,700	\$145,500	\$ 55,300	\$ 3,000	\$315,500

<sup>1/</sup>Includes costs for contracts and printing of special reports.

<sup>2/</sup>Includes cost of contract.

<sup>3/</sup>Includes cost for printing main report.

<sup>4/</sup>Includes travel costs to FAC meetings.



APPROVAL SHEET

Members of the USDA Field Advisory Committee and the sponsors agree to the general terms and conditions set forth in this Plan of Work for the Hamakua Area Agricultural Water Study.

SCS

Jack P. Kanalz  
Jack P. Kanalz, Chairman, FAC  
Soil Conservation Service  
P. O. Box 50004  
Honolulu, Hawaii 96850

4/4/79  
Date

ESCS

Norman E. Landgren  
Norman E. Landgren, Member, FAC  
Economics, Statistics, and  
Cooperatives Service  
100 Centennial Mall North, Room 435  
U.S. Federal Building & Courthouse  
Lincoln, Nebraska 68508

4/9/79  
Date

FS

Lyle M. Klubben  
Lyle Klubben, Member, FAC  
Forest Service  
630 Sansome St.  
San Francisco, California 94111

4/12/79  
Date

DLNR

Susumu Ono  
Susumu Ono, Chairman  
Board of Land and Natural Resources  
P. O. Box 621  
Honolulu, Hawaii 96809

5/8/79  
Date

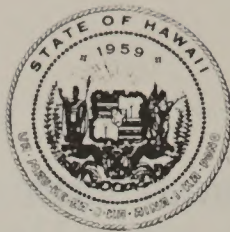
SWCD

Francis J. Pacheco  
Francis Pacheco, Chairman  
Mauna Kea Soil and Water Conservation  
District  
1186 Kinooole St.  
Hilo, Hawaii 96720

4/4/79  
Date



GEORGE R. ARIYOSHI  
~~DEPARTMENT OF LAND AND NATURAL RESOURCES~~  
GOVERNOR OF HAWAII



DIVISIONS:  
CONVEYANCES  
FISH AND GAME  
FORESTRY  
LAND MANAGEMENT  
STATE PARKS  
WATER AND LAND DEVELOPMENT

STATE OF HAWAII  
DEPARTMENT OF LAND AND NATURAL RESOURCES  
P. O. BOX 621  
HONOLULU, HAWAII 96809

September 12, 1977

Mr. Jack Kanalz  
State Conservationist  
Soil Conservation Service  
P.O. Box 50004  
Honolulu, Hawaii 96850

Dear Mr. Kanalz:

Hamakua Agricultural Water Study

We request that the Soil Conservation Service initiate a study of agricultural water in the Hamakua area under your existing Federal Program.

The Department of Land and Natural Resources supports the subject study. We would be most happy to discuss the scope of work leading to the preparation of the plan of study.

Should you have any questions please do not hesitate to call me.

Very truly yours,

W.Y. THOMPSON  
Chairman of the Board





